

بیماری جاروک مرکبات (لیموترش)
Witches' brooms disease of lime (WBDL)



عامل بیماری
Phytoplasma aurantifolia

All types of acid **limes** (*Citrus aurantifolia*) is **susceptible**.

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Symptoms caused by *Phytoplasma aurantifolia*

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Symptoms:

A common symptom resulting from *Phytoplasma* infection is **phyllody**, a condition in which a plant produces **leaf like** structures instead of **flowers**.

Leaves: **yellowing**. Many phytoplasma-infected plants acquire a **bushy** or **witches' broom** appearance due to **changes** in their **normal** growth patterns.

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Epidemiology:

Phytoplasmas are mainly **spread** by **insects** in the families Cicadellidae (**leafhoppers**), Fulgoridae (**planthoppers**), and Psyllidae (**psyllids**), which feed on the **phloem tissues** of infected plants.

Phytoplasmas may also be transmitted from infected to healthy plants through the **parasitic plant dodder** (*Cuscuta* sp.). Recently the possibility that phytoplasmas were transmitted by **seed** has also been reported.

Phytoplasmas can also be spread via **vegetative propagation** such as the **grafting** of infected plants onto healthy plants, propagation through **cuttings**, **micropropagation**.....

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Management:

Outbreaks of *Phytoplasma* disease epidemics can be controlled either by **controlling** the **vectors**, or by **eliminating** the **pathogens** from infected plants by **meristem tip culture**, by **antibiotics** or by other chemicals.

At present, insect vector control using **pesticides** is the method of choice for limiting outbreaks of *Phytoplasma* diseases.

On the other hand, **removal** of **sources of inoculum** is efficient for **reducing** mollicute diseases spread by monophagous vectors feeding on infected plants.

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Symptoms:

Because of the **slow** development of symptoms and the **long survival** of affected trees, its **detection** is difficult. However, **yields** are **reduced** drastically. The infected trees show a bunched and **stunted** and has **compact growth**.

Twigs: die back

Leaves: are small, often **mottled** and **chlorotic**, defoliation in **winter**.

Fruits: trees produce **fewer fruit**. Fruit are **small, lopsided**, delayed **coloration**, **aborted seeds**, usually **sour** and **bitter** and have an unpleasant **odor**.

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استابورن یا ریزبرگی مرکبات Citrus Stubborn



عامل بیماری
Spiroplasma citrii

This is present in **hot and dry** areas.
Sweet oranges and **grapefruits** are susceptible.

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Symptoms caused by *Spiroplasma citrii*

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Epidemiology:

Citrus stubborn is transmitted by budding and grafting, naturally in orchards by several leafhoppers such as: *Circulifer tenellus*, *Neoaliturus haemoceps* and *Scaphytopius nitridus*.

Management:

The control of disease depends on the use of **spiroplasma-free budwood** and **rootstocks**, as well as early **detection** and **removal** of infected trees. Use **tetracycline** antibiotics in young trees.

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Symptoms:

Leaves: show more number of **elongated translucent** areas on the **veins**, both vein **clearing** and vein **corking**, leaf **cupping**.

Root and Twigs: Roots **decay** and twigs **die back**.

Fruits: Fruit set **diminishes**.

Bark: **Stem pitting**, on the **inner** surface of the **bark**.

In general: the symptoms are **two** types:

Slow decline: vein **clearing**, **defoliation** of leaf in **autumn** (**Petioles remain**).

Quick decline: In **summer**, **Stem pitting**, seedling **yellowing**.

Some of the infected trees **decline overnight** and **dry up** in 2-3 days.

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بیماری ترستزای مرکبات Quick decline



عامل بیماری

Citrus tristeza virus (CTV)

Closterovirus, 200×11-12 nm. This is a **phloem-restricted** in natural citrus hosts.

West Indian **lime** (*Citrus aurantifolia*) is the most powerful tool to detect the virus.

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Symptoms caused by CTV

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Disease cycle:

Two strains of tristeza, viz the **Virulent** or **fulminate** and **avirulent** or **mild** have been recognized.

Among the two strains of virus, one of which is an independent agent of **stem-pitting**, while the other, known as **seedling yellows**.

Insect-Vector transmission of the virus by several insects viz., by *Toxoptera citricidus* (not in Iran), *T. aurantii*, *Aphis gossypii*, *A. craccivora*, *A. spiraecola*. *Myzus persica*.

Besides insects, the virus can be transmitted by **budding**, **grafting** and **dodder**.

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If you don't **know** your real **price**, be ready for **affliction**....

Anthony Robbins

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Management:

All **diseased** trees should be **removed** and fresh planting should be done

Pre-immunized seedling with **mild** strain of tristeza virus should be used

Virus free seedling should be used

Periodical spray with monocrotophos 0.05% reduces the secondary spread.

Use **tolerance** and **resistance** varieties of citrus.

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بیماری پژمردگی فوزاریومی یا بایود خرما

Fusarium wilt or Bayoud



عامل بیماری

Fusarium oxysporum f.sp. *albedinis*

The name bayoud comes from the Arabic word, "abiadh", meaning white which refers to the **whitening** of the **fronds** of diseased palms.

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Symptoms:

Leaves: The first symptom of the disease appears on a palm leaf of the middle crown. This leaf takes on an ash grey colour and then withens, from bottom to top. After one side has been affected, the whitening begins on the other side.

A brown stain appears lengthwise on the dorsal side of the rachis and advances from the base to the tip of the frond. This whitening and dying process of the pinnae may take from a few days to several weeks.

The disease advances ineluctably and the palm dies when the terminal bud is affected. The palm can die at any time from several weeks to several months after the appearance of the first symptoms. The rapid evolution of the symptoms depends mainly on planting conditions and on variety.

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Symptoms caused by Bayoud

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Symptoms:

Root: A small number of disease infected roots, reddish in colour, are revealed when an affected palm is uprooted. The spots are large and numerous towards the base of the stipe. As they advance towards the upper parts of the palm, the coloured conducting fascicles separate and their complicated path inside the healthy tissues can be followed.

Fronds: Palm fronds manifesting external symptoms exhibit a reddish brown colour when cut, showing highly coloured conducting fascicles. There is, therefore, a continuity of vascular symptoms that exist from the roots of the palm to the tips of the palm fronds.

The observation of symptoms is necessary to recognise the bayoud, but to identify this disease with certainty, samples of affected fronds must be analysed by a specialised laboratory.

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Disease cycle:

Fusarium o. f.sp. albedinis is preserved in the form of chlamydospores in the dead tissues of infected palm, especially in the roots which have been killed by the disease and in the soil.

Contamination occurs regularly from palm to palm and more rapidly as the amount of irrigation increases. The appearance of the disease in locations far from the original infected area is caused primarily by the transport of infected offshoots or palm fragments harbouring the fungus.

Many plants are often grown as intercrops in palm groves, notably *Medicago sativa*, *Lawsonia inermis* and vegetables. These plants can harbour the bayoud organism without manifesting any symptoms.

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Management:

Soil treatment of this type of disease is **destined**.

Palms are **uprooted** and **incinerated** on the spot.

The **soil** is then treated with **methyl bromide** or **chloropicrin** and the area closed off with **replanting** prohibited until further notice.

Since the contamination occurs mainly by **root contact**, disease-free palms can be isolated by **digging a trench of 2 m deep around them**. Water should be provided by a trough bridging the rest of the grove to this isolated plot. Under these conditions these palms can be **protected** for more than **10 years**.

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Symptoms:

It develops **sub-epidermal**, in small spots on **both sides** of the pinnae leaves, on the **rachis** and on the **leaf base**.

The numerous **fruiting structures** emerge as **small-yellow/brown to black sori**, 1 to 3 mm in diameter, with two layers. These **sori** are **abundant** on **three year-old** leaves, **conspicuous** on **two year-old**, but **absent** or infrequent on **one year-old** leaves. **This is because of the 10 - 11 month incubation cycle for this pathogen**. On a leaf, sori are **abundant** on **apical pinnae**, less **abundant** on the **middle** section becoming even **less** on the **basal section**.

The **normal** 6 - 8 year life of date palm fronds will be **reduced** to 3 years by *Graphiola* disease and heavily infected leaves **die** prematurely which consequently **reduce yield** of the palm.

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بیماری زگیل سیاه، سیاهک دروغی یا لکه گرافیولایی خرما Graphiola leaf spot, False smut



Kingdom: Fungi
Phylum: Basidiomycota
Class: Exobasidiomycetes
Order: *Exobasidiales*
Genus: *Graphiola*

عامل بیماری
Graphiola phoenicis

This is a **smut** fungus. Both of *Phoenix canariensis* and *Ph. dactylifera* are susceptible.

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Symptoms caused by *G. phoenicis*

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Management:

Control measures include **leaf pruning** coupled with **treatment** with **Bordeaux mixture**.

Any large spectrum fungicide (**mancozeb**, cupric hydroxide, cupric hydroxide + **maneb**, or copper oxychloride + maneb + zineb; **3 to 4** applications on a **15-day** schedule **after**, **sporulation**, have been recommended).

Genetic **tolerance** has been **found** in some.

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Symptoms:

The first **visible** symptom of the disease appears on the **external** surface of **unopened spathes** and is in the form of a **brownish** or **rusty-coloured** area.

It is most apparent on the **internal** face of the spathe where the fungus has already begun to **infect** the **inflorescence**. When the infected spathes split, they reveal **partial** or **complete destruction** of the **flowers** and **strands**.

Severely damaged spathes may remain closed and their internal contents may be completely infected. The **inflorescences** become **dry** and **covered** with **powdery fructifications** of the fungus.

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بیماری پوسیدگی گل آذین یا خامج خرما Khamedj disease or inflorescence rot

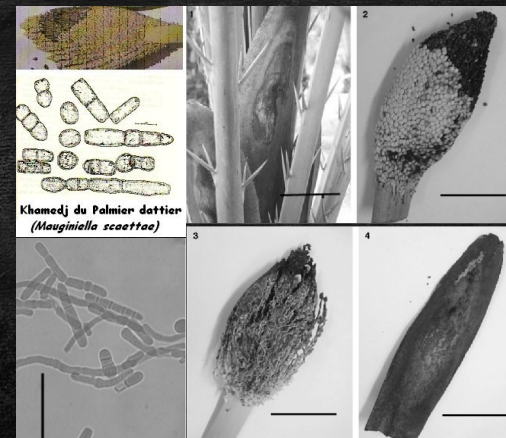
Kingdom: Fungi
Phylum: Ascomycota
Class: *Incertae sedis*
Order: *Incertae sedis*
Genus: *Mauginiella*



عامل بیماری
Mauginiella scattae

Fusarium moniliforme and *Thielaviopsis paradoxa* may rarely cause **inflorescence rot**.

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Symptoms caused by *M. scattae*

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Epidemiology:

It causes damage on inflorescences in **neglected palm** groves in **hot** and **humid** regions, or in areas with prolonged periods of **heavy rain**, 2 to 3 months **before emergence** of **spathes**.

The disease can reappear each year on the same palm with the same intensity and it is estimated that, in serious cases, 30 - 40 kg of fruits are lost annually.

Transmission of the disease **from** one palm to the next occurs **through** the **contamination** of **male inflorescences** during the **pollination period**. The infection of the **young inflorescence** occurs early and happens when the **spathe** is **still hidden** in the **leaf bases**. The fungus penetrates **directly** into the spathe and then **reaches** the inflorescences where the **fungus sporulates** abundantly.

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The **losers** find **problem** in every **answer**....

But,
the **winners** find an **answer** in every **problem**....

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Management:

The **frequent** appearance of the disease in neglected date plantations indicates that **good sanitation** and **efficient maintenance** is the **first step** in the control of **Khamedj** disease.

The **collection** and **burning** of all infected inflorescences and spathes should be **followed** by **treating** the diseased palms with the following **fungicides** after the **harvest** and **one month before** the **emergence** of **spathes**: a **bordeaux mixture** or a copper (1/3), or a 4 % **thirame** spray at the rate of 8 litres per palm.

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